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(पहला पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — INSTRUMENT SYSTEMS — TEMPERATURE GAUGES MECHANICAL TYPES — SPECIFICATION

(First Revision)

ICS 17.020; 43.060.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Automotive Electrical Equipments and Instruments Sectional Committee, TED 11

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipments and Instruments Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1992. In this revision, besides other changes, test conditions have been modified, cold test has been added and number of existing tests have been modified.

Mechanical type temperature gauges are used for indicating the temperature of the lubricating oil or cooling water.

For the purpose of deciding whether a particular requirement of this standard is complied, with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — INSTRUMENT SYSTEMS — TEMPERATURE GAUGES MECHANICAL TYPES — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies requirements for temperature gauges of mechanical type used for indicating lubricating oil or cooling water temperature of automotive engines.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below.

IS No.	*Title*
2500 (Part 1) : 2000	Sampling inspection procedures: Part 1 Attributes sampling plans indexed by acceptable quality level (AQL) for lot by lot inspection (*third revision*)
9000	Basic environmental testing procedures for electronic and electrical items:
(Part 2/Sec 3) : 1977	Cold test, Section 3 Cold test for non-heat dissipating items with gradual change of temperature
(Part 3/Sec 3) : 1977	Dry heat test, Section 3 Dry heat test for non-heat dissipating items with sudden change of temperature
(Part 7/Sec 2) : 1979	Impact test, Section 2 Bump
(Part 7/Sec 3) : 1979	Impact test, Section 3 Drop and topple
(Part 8) : 1981	Vibration (sinusoidal) test
(Part 11) : 1983	Salt mist test
(Part 12) : 1981	Dust test
(Part 14/Sec 2) : 1988	Test N : Change of temperature, Section 2 Test Nb : Change of temperature (temperature cycling) with specified rate of change — One chamber method
(Part 16) : 1983	Driving rain test
11086 : 1984	Speedometers and odometer systems for automotive applications

3 TYPES AND CLASSES

Mechanical type of gauges are broadly classified as bourdon tube (Class 1) and diaphragm (Class 2) types. A typical gauge is shown in Fig.1.

4 GENERAL REQUIREMENTS

4.1 The gauges shall consist of a sending and receiving units as a single body.

4.2 The graduation shall be in degree celsius. Typical dimensions shall be specified. Arrangements for illumination and details of tubing shall be as agreed to between the manufacturer and the purchaser.

4.3 High temperature warning/alarm should be provided with requisite colour code or suitable device as appropriate.

5 SAMPLING

Unless otherwise agreed upon, the sampling plan shall be in accordance with IS 2500 (Part 1).

6 TESTS

6.1 Test Conditions

The conditions for gauge shall be as follows, unless otherwise specified:

a) Temperature during the test shall be maintained at 25 ± 5 °C and humidity not less than 70 percent.

b) Mounting condition shall be determined on the kind of vehicles.

c) Thermometer with an accuracy of ±0.5°C shall be used for the temperature measurement

6.2 Performance Test

The gauge shall be mounted on the same position as it

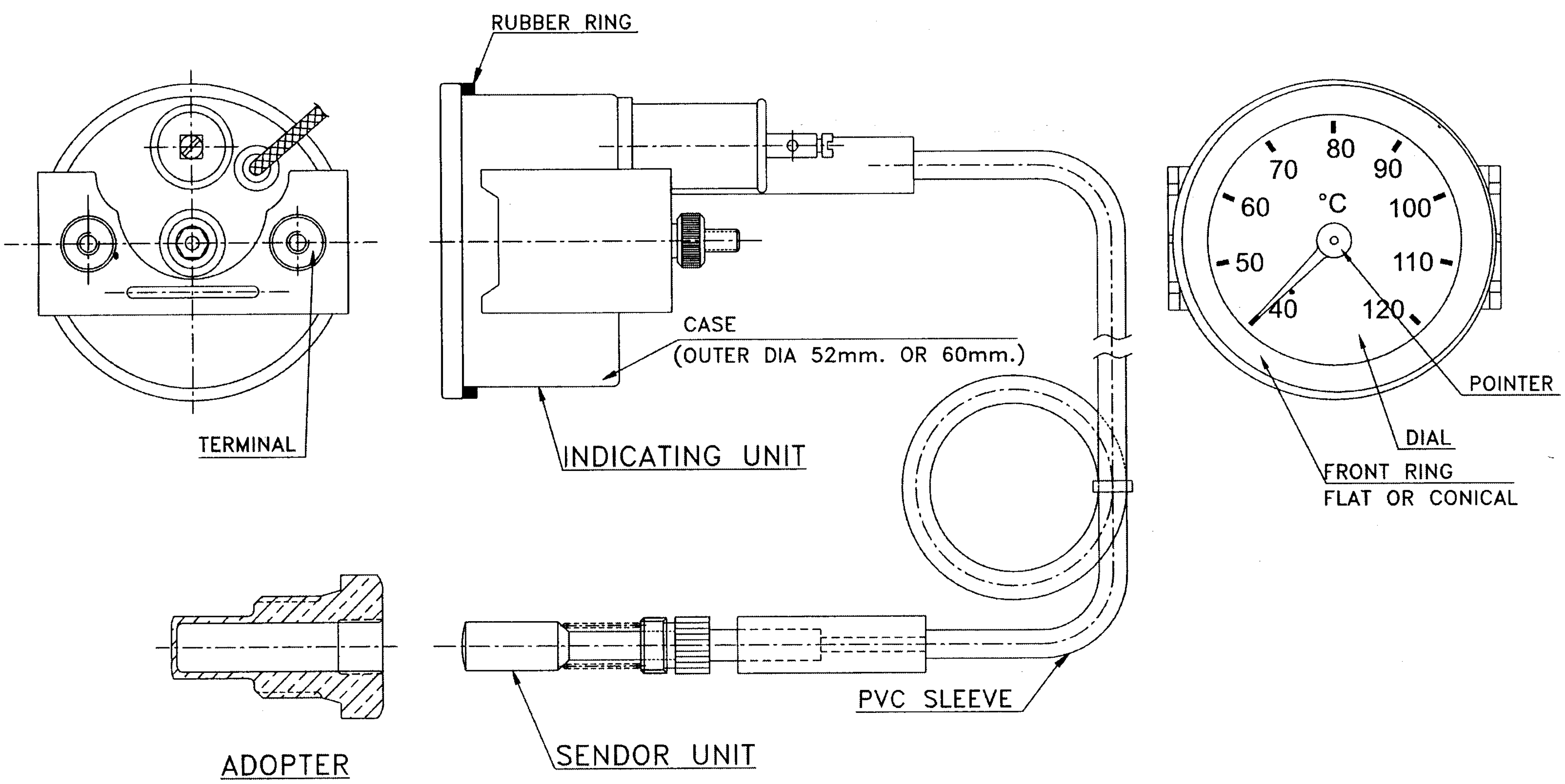

FIG. 1 MECHANICAL TEMPERATURE GAUGE

is in the vehicle and tested over its last two-thirds of the range. Site readings are taken in ascending scale.

6.3 Indication Error

Unless otherwise specified, the receiver unit shall be accurate to within ±3 percent of the full scale value for the last two-thirds of the range.

6.4 Heating and Rapid Cooling

When the sendor unit of the gauge is kept in a solution at highest graduation temperature for 5 min and then immediately cooled in the water at 25 ± 5°C temperature for 5 min. This process is repeated three times. At the end of test, there shall be no abnormalities. The permissible variation of the observed values from the initial values shall be ±2 percent of full scale value.

6.5 Temperature Resistance

When the gauge is tested as specified in IS 9000 (Part 14/Sec 2), each part shall comply with **6.3** and **6.4**. The permissible variation between the observed and initial values shall be ±2 percent of full scale value.

6.6 Vibration Test

When the gauge is mounted on a vibration tester to produce a simple harmonic motion, it shall vibrate through a frequency range of 10-55-10 Hz in 1 min. With continuously varying frequencies the vibration shall be applied for not less than 1 h in each of the three major axis as per IS 11086. The variation of the indication from that before the test shall be ±2 percent of the difference between the highest and lowest graduation temperatures. No abnormalities shall exist in other parts.

6.7 Endurance Test

The gauge when subjected to repeated heating and cooling from the lowest graduation to 80 percent of the highest graduation temperature and then cooled to lowest graduation temperature for 5 000 times at the rate of 6 min/cycle The permissible variation of the observed values from the initial values shall be ±2 percent of full scale value. No abnormalities shall exist in other parts.

6.8 Breaking and Elongation Strength

The breaking strength and elongation strength shall be checked on an universal/tensile testing machine. Either metallic braided sleeve or coiled spring shall be used to protect the capillary from any external damage. PVC sleeve shall also be used along with the above as an option in place where electrical insulation is required.

NOTE — The type of protection shall be as agreed to between the purchaser and the supplier.

6.9 Water Spray Test

When the gauge is tested as per IS 9000 (Part 16), exposing only the front parts for 2 h. All the opening shall be suitably sealed except in case of waterproof gauge. After test, there shall be no visible entry of water inside the gauge and also the permissible variation between the observed values from the initial value shall be ±2 percent of full scale value.

6.10 Dust Test

When the gauge is tested as per IS 9000 (Part 12) for 5 h. All the opening shall be suitably sealed except in case of dust proof gauge. After test, there shall be no visible entry of dust inside the gauge and also the permissible variation of the observed values from the initial values shall be ±2 percent of full scale value.

6.11 Dry Heat Test

When the gauge is tested as per IS 9000 (Part 3/Sec 3) with a gradual change of temperature under the following conditions:

a) Temperature : 70 ± 3°C
b) Duration of exposure : 4 h

After the test, visually examined for any defects and the permissible variation of the observed values from the initial values after the test shall be ±2 percent of full scale value.

6.12 Cold Test

When the receiver unit of the gauge is tested as specified in IS 9000 (Part 2/Sec 3) with a gradual change of temperature under the following conditions:

a) Temperature : –10 ± 3°C
b) Duration of exposure : 2 h

After test, the permissible variation between the observed value from the initial value shall be ±2 percent of full scale value.

6.13 Drop Test

When the gauge is tested as per IS 9000 (Part 7/Sec 3). The permissible variation of the observed values from the initial values after the test shall be ±2 percent of full scale value.

6.14 Bump Test

After the bump test carried out in accordance with IS 9000 (Part 7/Sec 2), the permissible variation of the observed values from the initial values after the test, shall be ±2 percent of full scale value.

6.15 Salt Spray Test

When the gauge is tested as per IS 9000 (Part 11) for 50 h consisting of two periods, each period being of 24 h of spraying and 1 h draining. The permissible variation of the observed values from the initial values shall be ±2 percent of full scale value. The visual appearance of the gauge after the test shall not prejudice assessment of results.

7 MARKING

7.1 The instrument shall be marked with symbol for the gauge, indicating the source of manufacture, serial number, date of manufacture, trade/brand name, printed preferably on the dial.

7.2 Any other marking as agreed to between the suppliers and the purchasers may also be printed.

7.3 BIS Certification Marking

The product may also be marked with the Standard Mark.

7.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standard* Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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This Indian Standard has been developed from Doc TED 11 (827).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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